

REMARKS

Claim Status

Claims 1-31 are pending. Claims 1-15 and 18-31 stand rejected. Claims 16 and 17 stand objected to, but are indicated as being allowable if rewritten in independent form. Applicant appreciates the examiner's indication of allowable subject matter. Applicant maintains the patentability of claims 1-15 and 18-31 and respectfully requests reconsideration and withdrawal of the rejections and objections to claims 1-31.

Claim Rejections - 35 U.S.C. § 102 and 103

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U. S. Patent No. 5,313,614 to Goettelmann et al., hereinafter "Goettelmann." The applicant respectfully traverses this rejection.

The applicant's invention takes a novel approach to emulation that overcomes the shortcomings of conventional emulation. According to the invention, the target program to be emulated on a host (*i.e.*, second) computer is first statically translated to a series of instructions of an intermediate instruction set. The intermediate instruction set is an instruction set that is optimized for interpretation on the host computer. **It is not the native instruction set of either the target machine (*i.e.*, first computer) or the host machine (*i.e.*, second computer); rather, it is an intermediate instruction set.** *The series of instructions of the intermediate instruction set is then executed by interpretation on the host computer.* Because, the intermediate instruction set is an instruction set that is optimized for interpretation on the host computer, the execution of the series of instructions by interpretation is generally faster than conventional interpretation. Further, the intermediate instructions are executed (by interpretation) ***without further translation*** into assembly code or machine code particular to the host computer. These features are recited in each of the independent claims 1, 9, 19, and 27.

Goettelmann does not disclose or suggest these features of claims 1, 9, 19, or 27. Generally, Goettelmann discloses conventional translation of code from a first code (for a first machine) to a second code (for a second machine). More particularly, Goettelmann discloses that first code can be converted into an intermediate language representation (c. 15,

ll. 61-65). The intermediate language representation may then have redundancies and unnecessary code eliminated (c. 15, ll. 65-68) – *i.e.*, using a conventional optimization step. Finally, the intermediate language representation is *further translated* to machine specific assembly or object code of the second machine (c. 15, l. 68 - c. 16, l. 2).

While the method described in Goettelmann does at some point convert a target program into an intermediate set of instructions, Goettelmann expressly teaches *further translating* the intermediate instructions into assembly code (*i.e.*, the **native** instruction set) of the host machine and *then* using either an interpreter to execute the translated, native machine assembly code (not the intermediate instructions) or compiling that translated, native machine code into machine specific object code on the host. Goettelmann does not teach or suggest interpreting the intermediate instructions directly by the second computer, as recited in the present claims.

Indeed, Goettelmann does not even disclose an intermediate instruction set ***being optimized for interpretation on the host computer***. This, of course, is not surprising because, again, Goettelmann never directly executes the intermediate language representation. Rather, Goettelmann ***further translates*** the intermediate language representation into the machine specific assembly or object code of the second computer(c. 15, ll. 61-65 and Fig. 12).

Because Goettelmann does not describe the direct interpretation of the intermediate instruction set representation, nor an intermediate instruction set that is optimized for interpretation on the host computer, Goettelmann cannot anticipate claims 1, 9, 19, or 27 of the instant application.

Applicant respectfully submits that the examiner appears to be reading a single sentence of Goettelmann out of context (*i.e.*, Goettelmann c. 31, lines 50-55). To provide the appropriate context, applicant has summarized Goettelmann in the attached chart. As summarized in the chart, Goettelmann describes a system (see Goettelmann System chart) that includes a translator 62 that can translate from a source machine application to a translated application for a second machine (Fig. 6). The translator 62 includes three parts: Parsing, Transformation (Optimization), and Code Generation (Fig. 12 and c. 15, lines 58-61). The Code Generation part includes two sub-parts: Conversion and Assembly (c. 29, lines 59-65). These various parts of translator 62 work in series to convert from a source application to translated code in the native instruction set of the second computer.

Specifically, according to main embodiment of the method of Goettelmann, the Parser first disassembles, analyzes and maps the program from source code (Box A) to an intermediate language representation of the source application (Box B) (c. 19, lines 2-7 and more generally from c. 16, line 5 to c. 21, line 15).

Second, the Transformation takes as input the intermediate language representation of the source application (Box B) (c. 21, lines 46-48) and performs various optimizations including dead code elimination to yield optimized code in the form of the intermediate language (Box C) (c. 22, lines 20-21, and more generally from c. 21, line 16 to c. 29, line 53). (Note here that Goettelmann's intermediate code is not executed on any host machine by interpretation.)

Third, and where Goettelmann differs significantly from the claimed invention, the Code Generation converts, or translates, the optimized intermediate language representation (Box C) to an assembly language (*i.e.*, a native instruction set of the second computer) representation of the source application (Box D) and assembles that representation into target machine object code (Box E) for execution on the target machine (c. 29, lines 58-65 and more generally from c. 29, line 55 to c. 31, line 10.) In this manner, Goettelmann provides a technique for converting from a source application to a second, translated program in the native instruction set of the second computer.

Column 31 of Goettelmann is directed to alternative embodiments. At lines 51-53, Goettelmann states that "it may be desired to execute the translated program in assembly form (using an interpreter) rather than compiling it into target machine object form." Here, Goettelmann is clearly referring to the assembly language representation (Box D) that has been generated by the Code Generation/Conversion. This second embodiment is shown as Goettelmann Other Embodiment.

The examiner, however, appears to be reading the assembly form of Goettelmann the same as the intermediate instruction form. Such a reading is not correct. As Goettelmann expressly states in the quoted sentence, it is the "**translated program in assembly form**" and not the intermediate representation that is interpreted in this alternative embodiment of Goettelmann. Goettelmann does not describe the direct interpretation of the intermediate instruction set representation, nor does Goettelmann describe an intermediate instruction set

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**PATENT
REPLY FILED UNDER EXPEDITED
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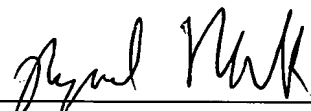
that is optimized for interpretation on the host computer, as recited in independent claims 1, 9, 19, or 27 of the instant application.

Accordingly, applicant submits that claims 1, 9, 19, and 27 are patentable over the cited reference. Inasmuch as claims 2-8, 10-18, 20-26, and 28-31 depend from one of claims 1, 9, 19, and 27, these claims are patentable at least based on their dependency from one of claims 1, 9, 19, and 27. For the foregoing reasons, applicants respectfully request reconsideration and withdrawal of the section 102 and 103 rejection of claims 1-15 and 18-31 and the objections to claims 16 and 17.

Conclusion

For the foregoing reasons, applicants respectfully submit that all of the claims of the present application patentably define over the cited references of record, alone or in combination. Reconsideration of the office action and an early notice of allowance are respectfully requested. In the event that the examiner cannot allow the present application for any reason, the examiner is encouraged to contact the undersigned attorney, Raymond N. Scott, Jr. at (215) 564-8951, to discuss resolution of any remaining issues.

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